

10/660,754
DOCKET NO. K06-161131M/TBS

6

AMENDMENTS TO THE CLAIMS:

- Claim 1. (Previously presented) A cross joint comprising:
a cross shaft member comprising:
four shafts each comprising a neck portion and a race portion; and
shoulder portions between adjacent neck portions;
rolling members adapted to rotate on the race portions; and
bearing cups fitted to the respective shafts via the rolling members,
wherein the race portions and the shoulder portions are subjected to roller burnishing
for increasing a hardness of each surface of the race portions and the shoulder portions and
for increasing a residual compressive stress immediately below each of said surfaces.
- Claim 2. (Previously presented) The cross joint according to claim 1, wherein a race
portion formed on a bearing cup is subjected to roller burnishing.
- Claim 3. (Previously presented) The cross joint according to Claim 1, wherein a
residual compressive stress at a depth of approximately 0.3 mm from each of surfaces of the
race portions and the shoulder portions subjected to the roller burnishing is equal to or larger
than 800 MPa.
- Claim 4. (Previously presented) The cross joint according to Claim 1, wherein the cross
shaft member and the bearing cups comprise a carbon steel having a carbon content equal to
or larger than 0.42 weight %.

10/660,754

7

DOCKET NO. K06-161131M/TBS

Claims 5-6. (Canceled).

Claim 7. (Previously presented) The cross joint of claim 1, wherein said shoulder portions each comprise a round-shaped section.

Claim 8. (Previously presented) The cross joint of claim 7, wherein said round-shape section has a center of curvature at an outer side of said cross shaft member.

Claims 9-10. (Canceled).

Claim 11. (Previously presented) The cross joint of claim 1, wherein at least one of said roller members comprises a cylindrical roller.

Claim 12. (Previously presented) The cross joint of claim 1, wherein at least one of said roller members comprises a needle roller.

Claim 13. (Previously presented) The cross joint of claim 1, wherein at least one of said shoulder portions comprises a hardness approximately equal to or larger than Hv700 from a surface to at least a depth of approximately 0.2 millimeters.

Claim 14. (Previously presented) The cross joint of claim 13, wherein at least one of said shoulder portions comprises a hardness approximately equal to or larger than Hv700 from a surface to at least a depth of approximately 0.4 millimeters.

10/660,754
DOCKET NO. K06-161131M/TBS

8

Claim 15. (Canceled).

Claim 16. (Previously presented) A cross joint comprising:

a cross shaft comprising:

a plurality of shafts each comprising a neck and a race, and

at least one roller-burnished shoulder between two of said necks; and

at least one roller on said race; and

a bearing cup fitted to one of said plurality of shafts via said at least one roller.

Claim 17. (Previously presented) The cross joint of claim 16, wherein at least one of said races comprises a roller-burnished race.

Claim 18. (Currently amended) The cross joint of claim 16, wherein said roller-burnished race comprises a residual compressive stress substantially equal to or larger than 800 Mpa from a surface to a depth of approximately 0.3 millimeters.

Claim 19. (Previously presented) The cross joint of claim 16, wherein said bearing cup comprises a roller burnished race.

Claim 20. (Previously presented) The cross joint of claim 16, wherein said roller-burnished shoulder comprises a residual compressive stress substantially equal to or larger than 800 Mpa from a surface to a depth of approximately 0.3 millimeters.

10/660,754

9

DOCKET NO. K06-161131M/TBS

Claim 21. (Previously presented) The cross joint of claim 16, wherein said cross shaft comprises a carbon steel.

Claim 22. (Previously presented) The cross joint of claim 21, wherein said carbon steel comprises a carbon content approximately equal to or larger than 0.42 percentage by weight.

Claim 23. (Previously presented) The cross joint of claim 16, wherein said bearing cup comprises a carbon steel.

Claim 24. (Previously presented) The cross joint of claim 23, wherein said carbon steel comprises a carbon content approximately equal to or larger than 0.42 percentage by weight.

Claim 25. (Previously presented) The cross joint of claim 16, wherein said at least one roller-burnished shoulder comprises a round-shaped section.

Claim 26. (Previously presented) The cross joint of claim 25, wherein said round-shaped section has a center of curvature at an outer side of said cross shaft.

Claims 27-28. (Canceled).

Claim 29. (Previously presented) The cross joint of claim 16, wherein said at least one roller comprises a cylindrical roller.

10/660,754

10

DOCKET NO. K06-161131M/TBS

Claim 30. (Previously presented) The cross joint of claim 16, wherein said at least one roller comprises a needle roller.

Claim 31. (Previously presented) The cross joint of claim 16, wherein said at least one roller-burnished shoulder comprises a hardness approximately equal to or larger than Hv700 from a surface to at least a depth of approximately 0.2 millimeters.

Claim 32. (Previously presented) The cross joint of claim 31, wherein said at least one roller-burnished shoulder comprises a hardness approximately equal to or larger than Hv700 from a surface to at least a depth of approximately 0.4 millimeters.

Claim 33. (Canceled).

Claim 34. (Previously presented) The cross joint of claim 16, wherein the roller burnishing of the shoulder increases a surface hardness of the shoulder.

Claim 35. (Previously presented) The cross joint of claim 16, wherein the roller burnishing of the shoulder increases a residual compressive stress immediately below the surface of the shoulder.

Claim 36. (Previously presented) The cross joint of claim 17, wherein the roller burnishing of the race increases a surface hardness of the race.

10/660,754

11

DOCKET NO. K06-161131M/TBS

Claim 37. (Previously presented) The cross joint of claim 17, wherein the roller
burnishing of the race increases a residual compressive stress immediately below the surface
of the race.